

Rule 312 Amendment

U.S. Application Serial No. 10/714,509

Attorney Docket No. MR/97-001.D.C.C.C1

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I. AMENDMENTS TO THE SPECIFICATION

The sections below have been amended in the manner required by 37 C.F.R. §1.121 showing all changes (i.e., with the additions underlined and the deleted portions stricken through).

A. IN THE "ABSTRACT" Section

Please amend the ABSTRACT section as indicated so that only the single underlined paragraph below appears.

ABSTRACT

A phased array coil system is presented for use with a magnetic resonance system. The phased array coil system includes a first coil, a second coil, and an interface subsystem. The first coil defines a first region and the second coil defines a second region, with the first coil partially overlapping the second coil to define an overlap region formed by the intersection of the first and second regions. Operably connected with the first and second coils, the interface subsystem includes (i) a power splitter for splitting radio frequency (RF) power for delivery to the first and second coils and (ii) a phase compensator for adjusting the phase relationship of the RF power delivered to the first and second coils so that a magnetic field produced thereby in the overlap region is approximately equal to that produced near the center of each of the first and second regions.

~~[[A transmit/receive phased array coil system is presented for use with a magnetic resonance imaging (MRI) system. It includes first and second coils and an interface subsystem. The first and second coils cooperate to define an overlap region, thus forming a phased array coil subsystem. Connected to the phased array coil subsystem, the interface subsystem can be switched between (I) a transmit state wherein a magnetic field of substantial uniformity is transmitted not only over the first and second regions defined by the first and second coils, respectively, but also over the overlap region; and (II) a receive state wherein the interface subsystem receives a response of an anatomical structure within the phased array coil subsystem to the magnetic field and conveys it to the MRI system.]]~~

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B. IN THE "SUMMARY OF THE INVENTION" Section

Please amend the SUMMARY OF THE INVENTION section as indicated so that only the three underlined paragraphs below appear.

SUMMARY OF THE INVENTION

In a preferred embodiment, the invention provides a phased array coil system for use with a magnetic resonance imaging (MRI) system. The phased array coil system includes a first coil, a second coil, and an interface subsystem. The first coil defines a first region and the second coil defines a second region, with the first coil partially overlapping the second coil to define an overlap region formed by the intersection of the first and second regions. Operably connected with the first and second coils, the interface subsystem includes (i) a power splitter for splitting radio frequency (RF) power for delivery to the first and second coils and (ii) a phase compensator for adjusting the phase relationship of the RF power delivered to the first and second coils so that a magnetic field produced thereby in the overlap region is approximately equal to that produced near the center of each of the first and second regions.

In a related embodiment, the invention provides a phased array coil system for use with a magnetic resonance imaging (MRI) system. The phased array coil system includes a first coil, a second coil, and an interface subsystem. The first coil defines a first region and the second coil defines a second region, with the first coil partially overlapping the second coil to define an overlap region formed by the intersection of the first and second regions. Operably connected with the first and second coils, the interface subsystem includes (i) a power splitter for splitting radio frequency (RF) power for delivery to the first and second coils and (ii) a phase compensator for adjusting the phase relationship of the RF power delivered to the first and second coils to cause partial destructive/constructive interference thereof in the overlap region so that a magnetic field produced thereby in the overlap region is approximately equal to that produced near the center of each of the first and second regions.

In a further related embodiment, the invention provides a transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system. The T/R phased array coil system includes a first birdcage coil, a second birdcage coil, and an interface

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subsystem. The first birdcage coil encompasses a first region, the second birdcage coil encompasses a second region, with the first and second birdcage coils defining an overlap region in which one of the birdcage coils is partially overlapped by the other of the birdcage coils to form a phased array coil subsystem. Connected to the phased array coil subsystem, the interface subsystem includes a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling the interface subsystem to be switched between a transmit state and a receive state. In the transmit state, the power splitter allocates radio frequency (RF) power received from the MRI system between the first and second birdcage coils with the attenuator reducing the RF power directed to at least one of the first and second birdcage coils so that (A) a first magnetic field is applied through the first birdcage coil to the first region encompassed thereby and (B) a second magnetic field is applied through the second birdcage coil to the second region encompassed thereby with the phase compensator affecting a phase relationship between the first and second magnetic fields so that a resulting magnetic field produced thereby in the overlap region is approximately equal to the first and second magnetic fields produced near the center of the first and second regions, respectively. In the receive state, the interface subsystem receives from the phased array coil subsystem a response of an anatomical structure placed therein and conveys the response to the MRI system.

~~[[In a presently preferred embodiment, the invention provides a transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system. The T/R phased array coil system includes a first coil, a second coil, and an interface subsystem. The first coil defines a first region, and the second coil defines a second region. The first and second coils cooperate to define an overlap region in which one of the coils is partially overlapped by the other to form a phased array coil subsystem. Connected to the phased array coil subsystem, the interface subsystem preferably includes a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling the interface subsystem to be switched between a transmit state and a receive state. In the transmit state, the power splitter allocates radio frequency (RF) power received from the MRI system between the first and second coils, with the attenuator reducing the RF power directed to at least one of the first and second coils. This allows a first magnetic field to be applied through the first coil to the first region corresponding thereto and a second magnetic field to be applied through the second coil to the second region corresponding~~

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~~thereto. The phase compensator affects the phase relationship between the first and second magnetic fields so as to cause a resultant magnetic field to be substantially uniform not only over at least portions of the first and second regions but also over the overlap region. This enables the phased array coil subsystem to apply the resultant magnetic field to an anatomical structure placed within at least one of the first region, the second region and the overlap region. In the receive state, the interface subsystem receives from the phased array coil subsystem a response of the anatomical structure to the resultant magnetic field and conveys the response to the MRI system.]]~~

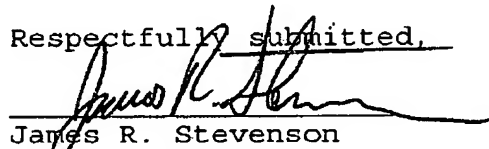
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CONCLUSION

In this Rule 312 Amendment, Applicant proposes minor revisions to the ABSTRACT and SUMMARY OF THE INVENTION sections of the application merely so that they comport with the invention as claimed. The proposed changes will neither affect the claims nor require any substantial work on the part of the Patent Office. Applicant respectfully requests entry of the amendments proposed herein before issuance of the application.

If the Examiner has any questions regarding this Rule 312 Amendment, he is invited to call the undersigned at the telephone number listed below.

Respectfully submitted,


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